APPENDIX 5-A. DRAFT ENGINEERING ANALYSIS DATA REQUEST SHEETS

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DOE seeks average **incremental production cost** to take basic models in the categories shown from the current DOE minimum efficiency level (or proposed baseline level) to the specified efficiency level. For those product classes where more than one basic model may exist, please indicate the minimum and maximum incremental costs that would be incurred across the array of basic models.

The data sheets are divided by product and contain tables requesting shipment and manufacturer cost data.

Shipments

For residential clothes dryers and room air conditioners, the AHAM *2005 Fact Book* offers historical shipments data (for both products) and efficiency data (for room air conditioners only), but the information is not disaggregated by product class. As shown in the "shipment request" tables below, DOE hopes to collect both shipments data and shipment-weighted average efficiency data dating back to 1993. In addition, DOE hopes to collect market share efficiency (*i.e.*, data on the distribution of product shipments by efficiency) for each of the product classes.

Manufacturer Costs

Incremental cost data (in U.S. dollars) include the materials, labor, and overhead needed to take basic models from the current minimum DOE baseline efficiency standard to each higher efficiency level. The depreciation of the conversion capital expenditures is an important component of the overhead for DOE to understand. Therefore, DOE is requesting information about conversion capital expenditures by efficiency level.

5-A.1 ENGINEERING ANALYSIS DATA REQUEST SHEETS FOR RESIDENTIAL CLOTHES DRYERS

Table A1-1 Residential Clothes Dryer Shipment and Shipment-Weighted Average Efficiency Data

	Shipments, Domestic + Imports (Thousands of Units)						Shipment-Weighted Average Efficiency (EF)			
	Vented				Vent-less		Vented			
	Electric				Electric		Electric			
Year	Standard	Compact 120v	Compact 240v	Gas	Compact 240v	Combo	Standard	Compact 120v	Compact 240v	Gas
1993										
1994										
1995										
1996										
1997										
1998										
1999										
2000										
2001										
2002										
2003										
2004										
2006										

Table A1-2 Residential Clothes Dryer Market Share Efficiency Data: Vented Electric Standard and Compact 120v

Vented Electric Standard		Vented Electric Compact 120v	
Efficiency Bins (EF)	Market Share for 2005 or 2006* (Percent)	Efficiency Bins (EF)	Market Share for 2005 or 2006* (Percent)
3.01-3.09		**3.13-3.19**	
3.10-3.19		**3.20-3.29**	
3.20-3.29		**3.30-3.39**	
> 3.29		**> 3.39**	

* Total market share percentages should equal 100%.

Table A1-3 Residential Clothes Dryer Market Share Efficiency Data: Vented Electric Compact 240v and Gas

Vented Electric Compact 240v		Vented Gas	
Efficiency Bins (EF)	Market Share for 2005 or 2006* (Percent)	Efficiency Bins (EF)	Market Share for 2005 or 2006* (Percent)
2.90-2.96		**2.67-2.74**	
2.97-3.06		**2.75-2.84**	
3.07-3.17		**2.85-2.94**	
> 3.17		**> 2.94**	

* Total market share percentages should equal 100%.

Table A1-4 Residential Clothes Dryer Manufacturer Cost Data: Vented Electric Standard and Electric Compact 120V

Product Class ➔	Vented Electric Standard			Vented Electric Compact 120V		
Efficiency Level	1	2	3	1	2	3
EF (lb/KWh)	3.10	3.16	3.39	++	++	3.79
Design Options+						
	Average Incremental Costs ($ Per Unit)*					
Material						
Labor						
Overhead#						
	Minimum Incremental Costs ($ Per Unit)*					
Material						
Labor						
Overhead#						
	Maximum Incremental Costs ($ Per Unit)*					
Material						
Labor						
Overhead#						
	Conversion Capital Expenditures ($, Millions)					
Building CAPX						
Tooling/ Equipment CAPX						
	One-Time Product Conversion Expenses ($, Millions)					
R&D						
Marketing						

+Manufacturer respondents should suggest the design option or design option combinations that they believe should be associated with each efficiency level.
++ DOE was unable to obtain data for any clothes dryers with efficiencies between the standard level of EF = 3.13 and the max available level of EF = 3.79. Therefore, manufacturer respondents should suggest representative intermediate efficiency levels.
# Depreciation on the conversion capital expenditure should NOT be included in the incremental overhead.
***** Incremental costs per unit should be reported relative to the baseline unit's cost. The baseline unit complies with the current Federal standard for residential clothes dryers.

Table A1-5 Residential Clothes Dryer Manufacturer Cost Data: Vented Electric Compact 240V and Gas

Product Class →	Vented Electric Compact 240 V			Vented Gas		
Efficiency Level	1	2	3	1	2	3
EF (lb/KWh)	2.98	3.07	3.23	2.75	2.77	3.02
Design Options+						
	Average Incremental Costs ($ Per Unit)*					
Material						
Labor						
Overhead#						
	Minimum Incremental Costs ($ Per Unit)*					
Material						
Labor						
Overhead#						
	Maximum Incremental Costs ($ Per Unit)*					
Material						
Labor						
Overhead#						
	Conversion Capital Expenditures ($, Millions)					
Building CAPX						
Tooling/ Equipment CAPX						
	One-Time Product Conversion Expenses ($, Millions)					
R&D						
Marketing						

+Manufacturer respondents should suggest the design option or design option combinations that they believe should be associated with each efficiency level.
Depreciation on the conversion capital expenditure should NOT be included in the incremental overhead.
***** Incremental costs per unit should be reported relative to the baseline unit's cost. The baseline unit complies with the current federal standard for residential clothes dryers.

Other Information:

1. What depreciation method would your company use to depreciate the conversion capital expenditures? _____.

Direct material – Costs of raw materials including scrap that can be traced to final or end products. Direct material costs do not include indirect material costs which are attributed to supplies that may be used in the production process but are not assigned to final products (*e.g.*, lubricating oil for production machinery).
Direct labor – The earnings of workers who assemble parts into a finished good for operate machines in the production process. Direct labor includes the fringe benefits of direct laborers such as group health care, as well as overtime pay. Direct labor does not include indirect labor which is defined as the earnings of employees who do not work directly in assembling a product, such as supervisors, janitors, stockroom personnel, inspectors, and forklift operators.
Overhead – Factory overhead excluding depreciation. Factory overhead includes indirect labor, downtime, set-up costs, indirect material, expendable tools, maintenance, property taxes, insurance on assets, and utility costs. Factory overhead does not include selling, general, and administrative costs (SG&A); research and development (R&D); interest; or profit (accounted for by DOE separately).

Full Production Cost = Direct Material + Direct Labor + Overhead (factory) + Depreciation
Full Cost of Product = Full Production Cost + Non-production Costs (SG&A, R&D, interest, and profit)

5-A.2 ENGINEERING ANALYSIS DATA REQUEST SHEETS FOR ROOM AIR CONDITIONERS

Table A2-1 Room Air Conditioner Market Share Product Class Data (percent)*

	Without Reverse Cycle (RC) and With Louvered Sides (LS)					Without Reverse Cycle (RC) and Without Louvered Sides (LS)					With RC and With LS		With RC and Without LS		Casement	
Year	<6k	6-8k	8-14k	14-20k	>20k	<6k	6-8k	8-14k	14-20k	>20k	<20k	>20k	<14k	>14k	Only	Slider
2000																
2001																
2002																
2003																
2004																
2005																
2006																

* Total market share percentages for each year should equal 100%.

Table A2-2 Room Air Conditioner Shipment-Weighted Efficiency Data (EER)

	Without Reverse Cycle (RC) and With Louvered Sides (LS)					Without Reverse Cycle (RC) and Without Louvered Sides (LS)					With RC and With LS		With RC and Without LS		Casement	
Year	<6k	6-8k	8-14k	14-20k	>20k	<6k	6-8k	8-14k	14-20k	>20k	<20k	>20k	<14k	>14k	Only	Slider
2000																
2001																
2002																
2003																
2004																
2005																
2006																

Table A2-3 Room Air Conditioner Market Share Efficiency Data: Without Reverse Cycle and With Louvered Sides

Less than 6,000 Btu/h		6,000 to 7,999 Btu/h		8,000 to 13,999 Btu/h		14,000 to 19,999 Btu/h		20,000 Btu/h and more	
Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)
9.7-10.0		**9.7-10.0**		**9.8-10.0**		**9.7-10.0**		**8.5-8.9**	
10.1-10.5		**10.1-10.5**		**10.1-10.5**		**10.1-10.5**		**9.0-9.4**	
10.6-11.0		**10.6-11.0**		**10.6-11.0**		**10.6-11.0**		**9.5-9.9**	
> 11.0		**> 11.0**		**> 11.0**		**> 11.0**		**> 9.9**	

* Total market share percentage should equal 100%.

Table A2-4 Room Air Conditioner Market Share Efficiency Data: Without Reverse Cycle and Without Louvered Sides

Less than 6,000 Btu/h		6,000 to 7,999 Btu/h		8,000 to 13,999 Btu/h		14,000 to 19,999 Btu/h		20,000 Btu/h and more	
Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)
9.0-9.4		9.0-9.4		8.5-8.9		8.5-8.9		8.5-8.9	
9.5-9.9		9.5-9.9		9.0-9.4		9.0-9.4		9.0-9.4	
10.0-10.4		10.0-10.4		9.5-9.9		9.5-9.9		9.5-9.9	
> 10.4		> 10.4		10.0-10.4		> 9.9		10.0-10.4	
				>10.4				>10.4	

* Total market share percentage should equal 100%.

Table A2-5 Room Air Conditioner Market Share Efficiency Data: With Reverse Cycle

With Louvered Sides, Less than 20,000 Btu/h		With Louvered Sides, 20,000 Btu/h and more		Without Louvered Sides, Less than 14,000 Btu/h		Without Louvered Sides, 14,000 Btu/h and more	
Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)
9.0-9.4		8.5-8.9		8.5-8.9		8.0-8.4	
9.5-9.9		9.0-9.4		9.0-9.4		8.5-8.9	
10.0-10.4		9.5-9.9		9.5-9.9		9.0-9.4	
10.5-10.9		> 9.9		> 9.9		9.5-9.9	
> 10.9						>9.9	

* Total market share percentage should equal 100%.

Table A2-6 Room Air Conditioner Market Share Efficiency Data: Casement Units

Casement-Only		Casement-Slider	
Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)	Efficiency Bins (EER)	Market Share for 2006 or 2007* (percent)
8.7-9.0		9.5-9.9	
9.1-9.5		10.0-10.4	
9.6-10.0		10.5-10.9	
> 10.0		> 10.9	

* Total market share percentage should equal 100%.

Table A2-7 Room Air Conditioner Manufacturer Cost Data

Product Class ➔	Without Reverse Cycle and with Louvered Sides, less than 6,000 Btu/h				Without Reverse Cycle and With Louvered Sides, 8000 - 13,999 Btu/h				
Efficiency Level	1	2	3	4	1	2	3	4	
EER	10.2	10.7	11.2	11.6	10.3	10.8	11.3	11.8	
Average Incremental Costs ($ Per Unit)*									
Material									
Labor									
Overhead#									
Minimum Incremental Costs ($ Per Unit)*									
Material									
Labor									
Overhead#									
Maximum Incremental Costs ($ Per Unit)*									
Material									
Labor									
Overhead#									
Conversion Capital Expenditures ($, Millions)									
Building CAPX									
Tooling/ Equipment CAPX									
One-Time Product Conversion Expenses ($, Millions)									
R&D									
Marketing									

Depreciation on the conversion capital expenditure should NOT be included in the incremental overhead.

***** Incremental costs per unit should be reported relative to the baseline unit's cost. The baseline unit complies with the federal standard for room air conditioners and is equal to an EER of 9.7 Btu/h/W for a unit without reverse cycle and with louvered sides and with a capacity of less than 6,000 Btu/h, an EER of 9.8 Btu/h/W for a unit without reverse cycle and with louvered sides and with a capacity of 8,000 to 13,999 Btu/h, and an EER of 8.5 Btu/h/W for a unit without reverse cycle and with louvered sides and with a capacity of 20,000 Btu/h and more.

Table A2-8 Room Air Conditioner Manufacturer Cost Data, continued

Product Class ➔	Without Reverse Cycle and with Louvered Sides, 20,000 Btu/h and more				Without Reverse Cycle and Without Louvered Sides, 8000 - 13,999 Btu/h				
Efficiency Level	1	2	3		1	2	3	4	
EER	9.0	9.5	10.0		9.0	9.5	10.0	10.5	
Average Incremental Costs ($ Per Unit)*									
Material									
Labor									
Overhead#									
Minimum Incremental Costs ($ Per Unit)*									
Material									
Labor									
Overhead#									
Maximum Incremental Costs ($ Per Unit)*									
Material									
Labor									
Overhead#									
Conversion Capital Expenditures ($, Millions)									
Building CAPX									
Tooling/ Equipment CAPX									
One-Time Product Conversion Expenses ($, Millions)									
R&D									
Marketing									

Other Information:

1. What depreciation method would your company use to depreciate the conversion capital expenditures? _____.

Direct material – Costs of raw materials including scrap that can be traced to final or end products. Direct material costs do not include indirect material costs which are attributed to supplies that may be used in the production process but are not assigned to final products (*e.g.*, lubricating oil for production machinery).
Direct labor – The earnings of workers who assemble parts into a finished good for operate machines in the production process. Direct labor includes the fringe benefits of direct laborers such as group health care, as well as overtime pay. Direct labor does not include indirect labor which is defined as the earnings of employees who do not work directly in assembling a product, such as supervisors, janitors, stockroom personnel, inspectors, and forklift operators.
Overhead – Factory overhead excluding depreciation. Factory overhead includes indirect labor, downtime, set-up costs, indirect material, expendable tools, maintenance, property taxes, insurance on assets, and utility costs. Factory overhead does not include selling, general, and administrative costs (SG&A); research and development (R&D); interest; or profit (accounted for by DOE separately).
Full Production Cost = Direct Material + Direct Labor + Overhead (factory) + Depreciation
Full Cost of Product = Full Production Cost + Non-production Costs (SG&A, R&D, interest, and profit)

Table A2-9: Portable Air-Conditioner Shipment Data

Year	Total Sales	Percent of Sales by Different Condenser Air Duct Configurations			Percent of Sales with Condensate Re-evaporation Capability
		Single Duct	Two-Duct	Other	
2000					
2001					
2002					
2003					
2004					
2005					
2006					
2007					

Table A2-10: Portable Air-Conditioner Capacity Data

Capacity Range (Btu/hr)	Percent of Sales for a Recent Year (2006 or 2007)
Less than 6,000	
6,000 to 7,999	
8,000 to 13,999	
14,000 to 19,999	
20,000 or more	

5-A.3 DATA REQUESTS FOR STANDARDS RULEMAKING FOR RESIDENTIAL CLOTHES DRYERS AND ROOM AIR-CONDITIONERS

Data Requests for Standards Rulemaking for Residential Clothes Dryers and Room Air-Conditioners – 01/09/2009

Clothes Dryers

1. Shipment-weighted average remaining moisture content (RMC) over time for residential clothes washers for top-loading units, front-loading units, and combined.

2. Data regarding consumer usage patterns for residential clothes dryers- the # of annual use cycles. Preferably the number of dryer use cycles independent of wash cycles. If not, then the % of loads washed that are machine dried.

3. Has AHAM made any progress on the development of a clothes dryer test procedure which tests dryer operation using automatic termination?

4. Is AHAM developing test methodology for condensing dryers?

Room Air Conditioners

1. Data regarding consumer usage patterns – room air-conditioner annual hours of operation.